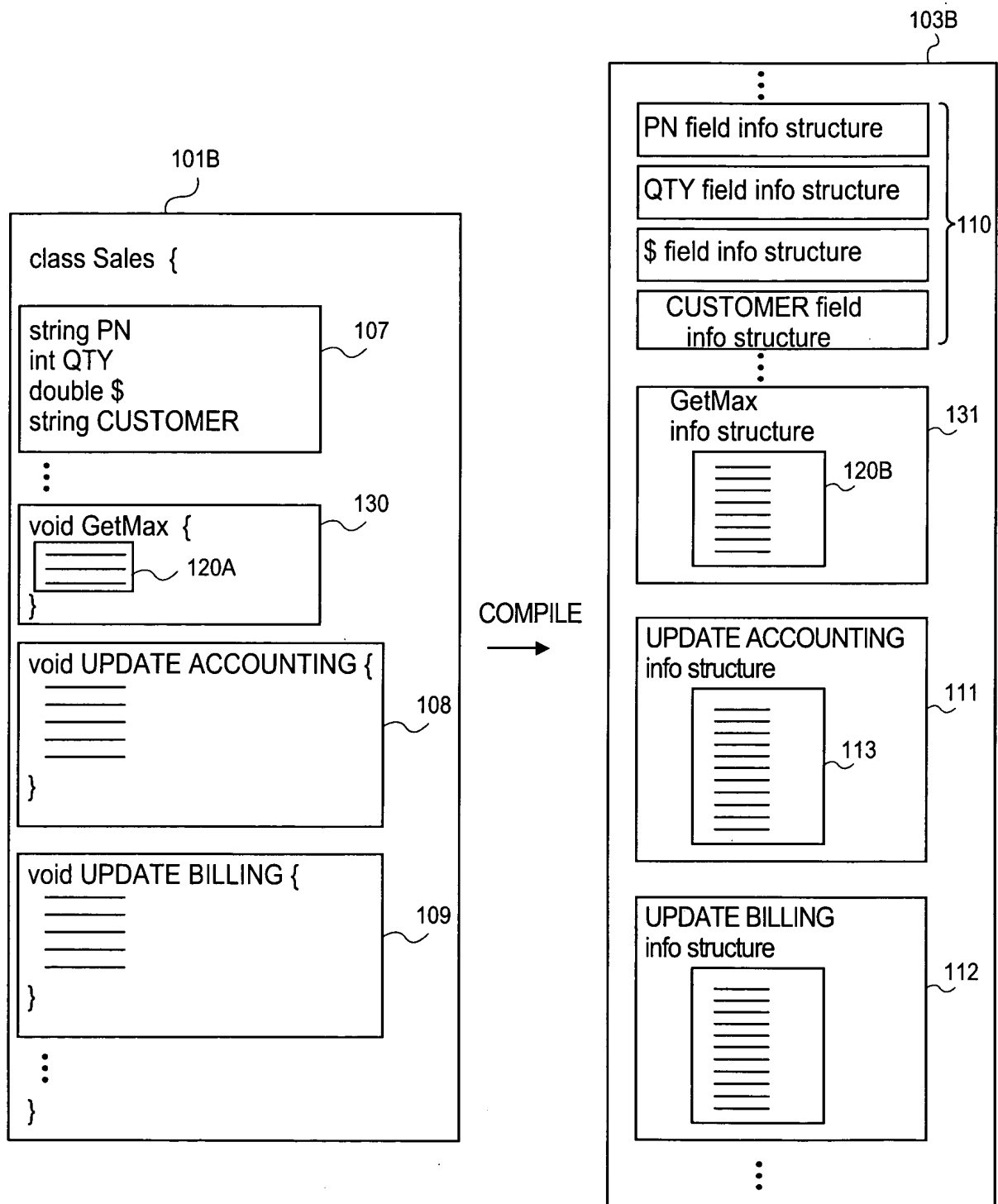
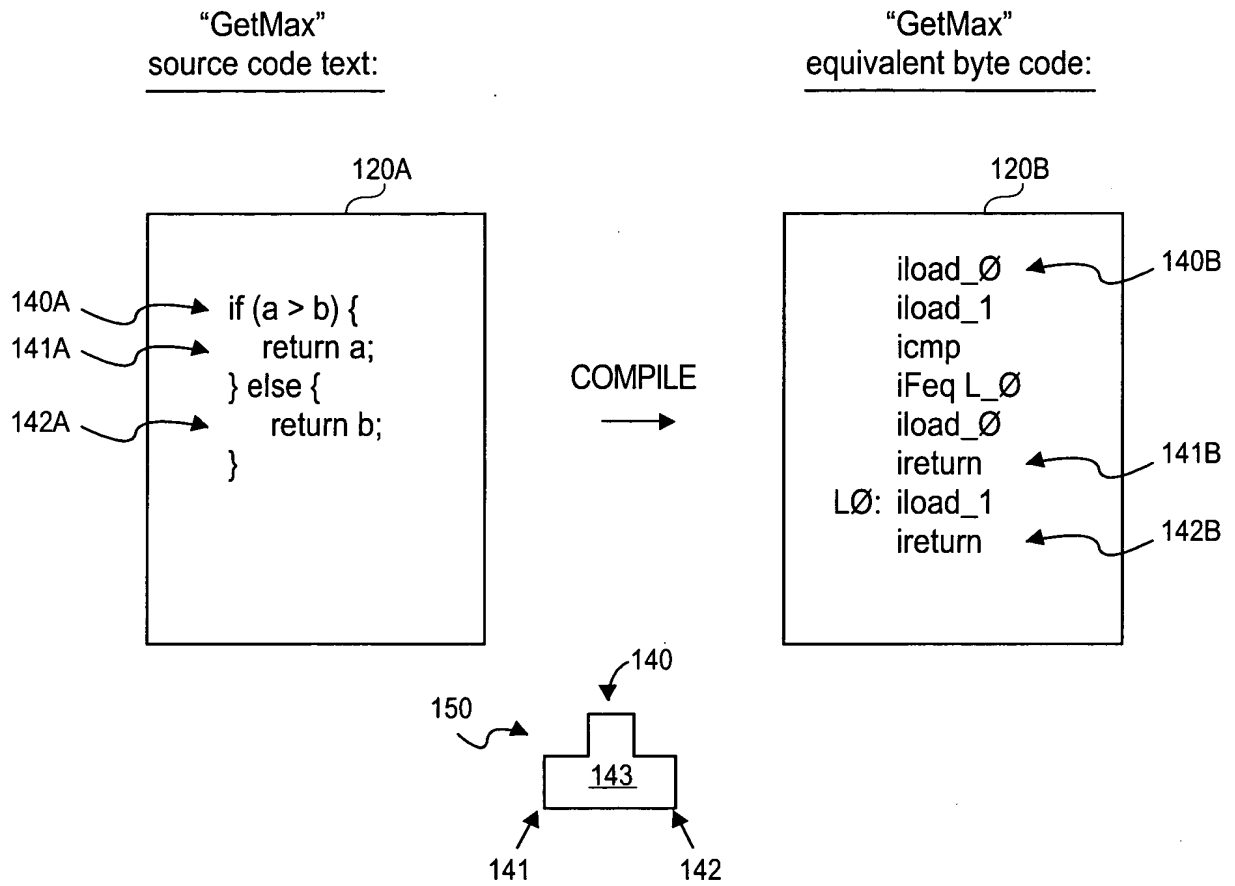


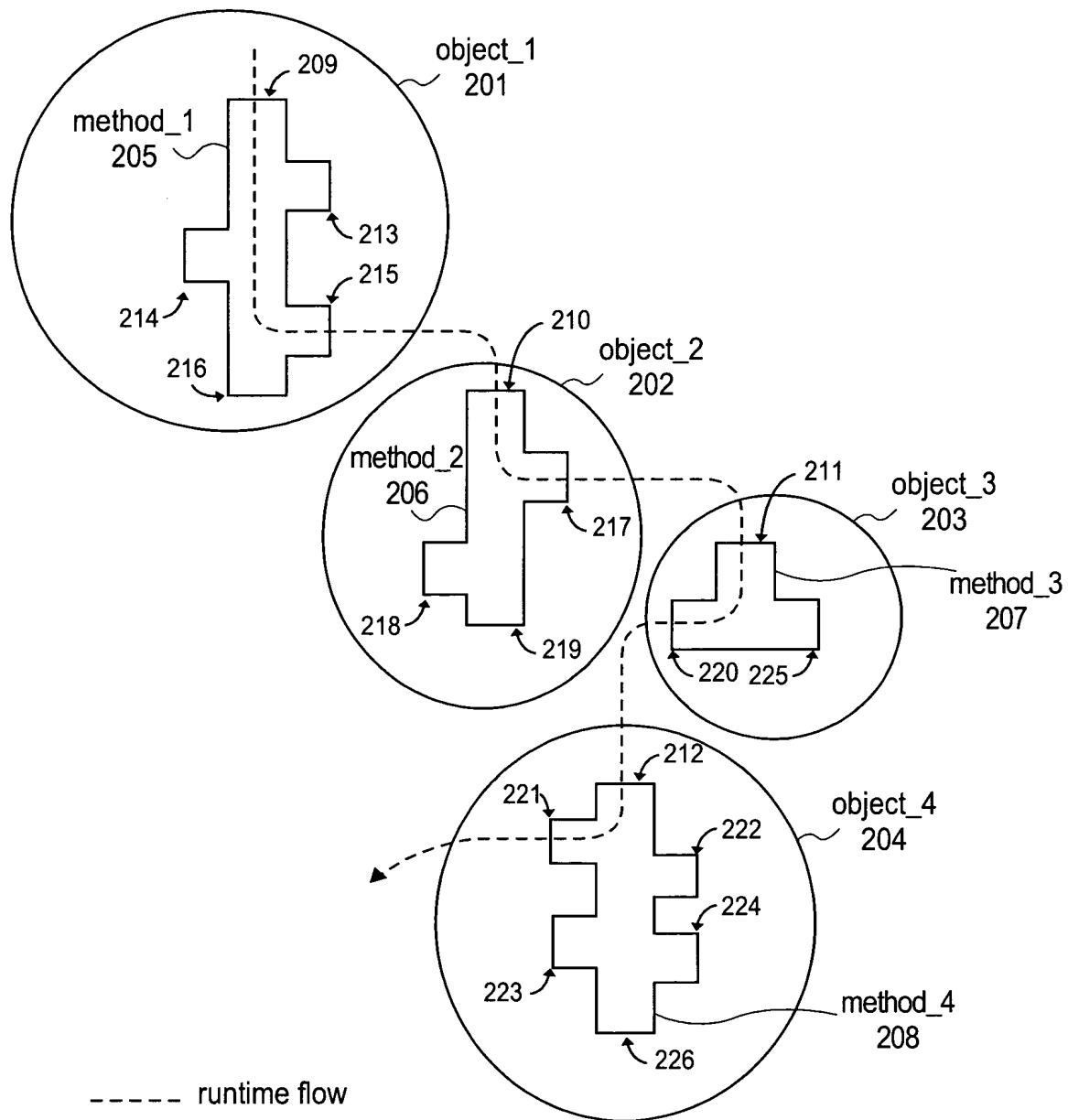
**FIG. 1A**  
(PRIOR ART)



**FIG. 1B**  
(PRIOR ART)



**FIG. 1C**  
(PRIOR ART)



**FIG. 1D**  
(PRIOR ART)

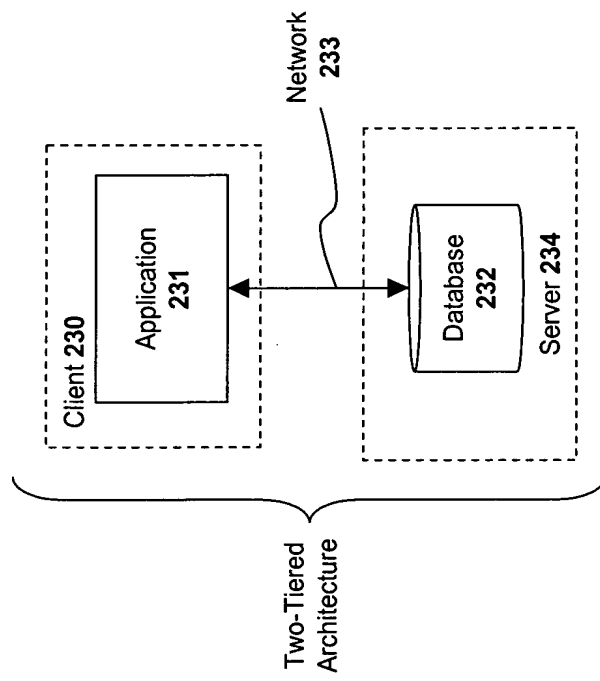


FIG. 2A  
(prior art)

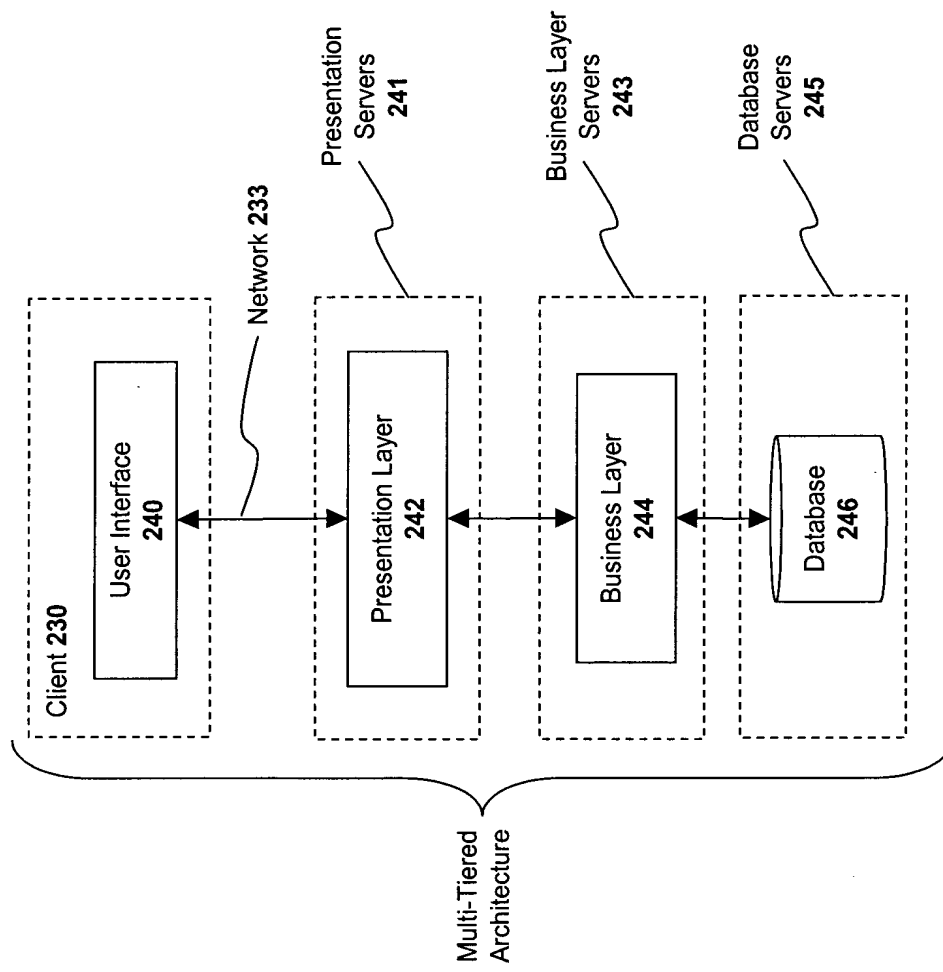
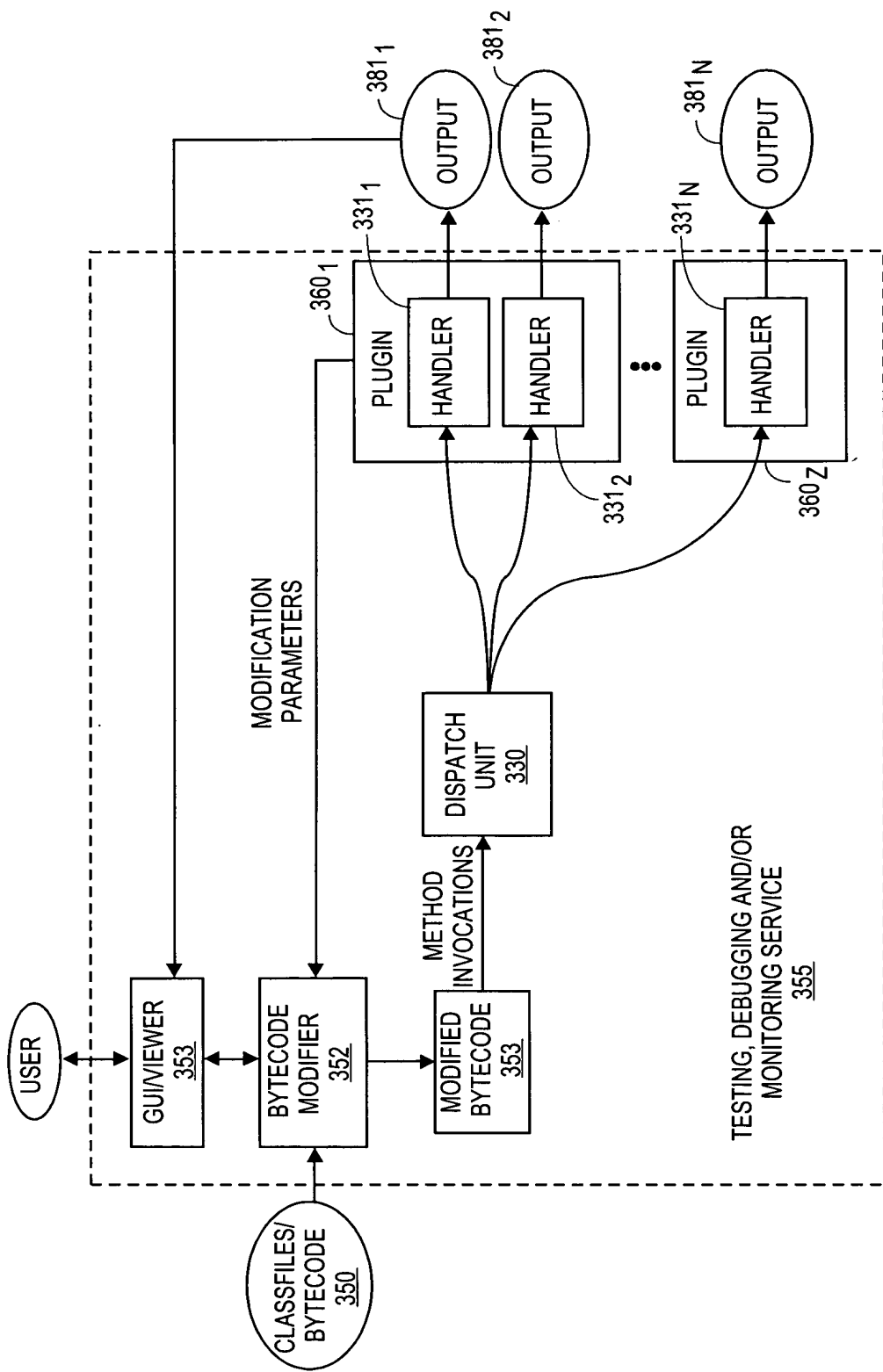


FIG. 2B  
(prior art)



**FIG. 3**

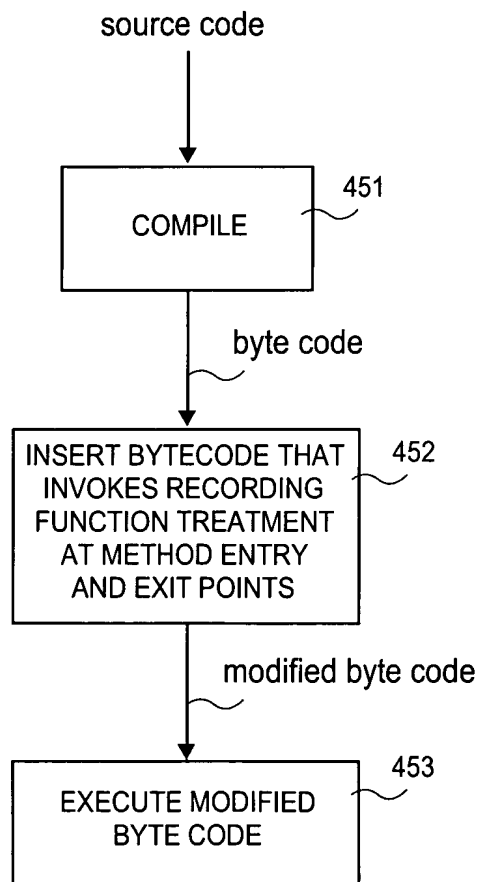


FIG. 4A



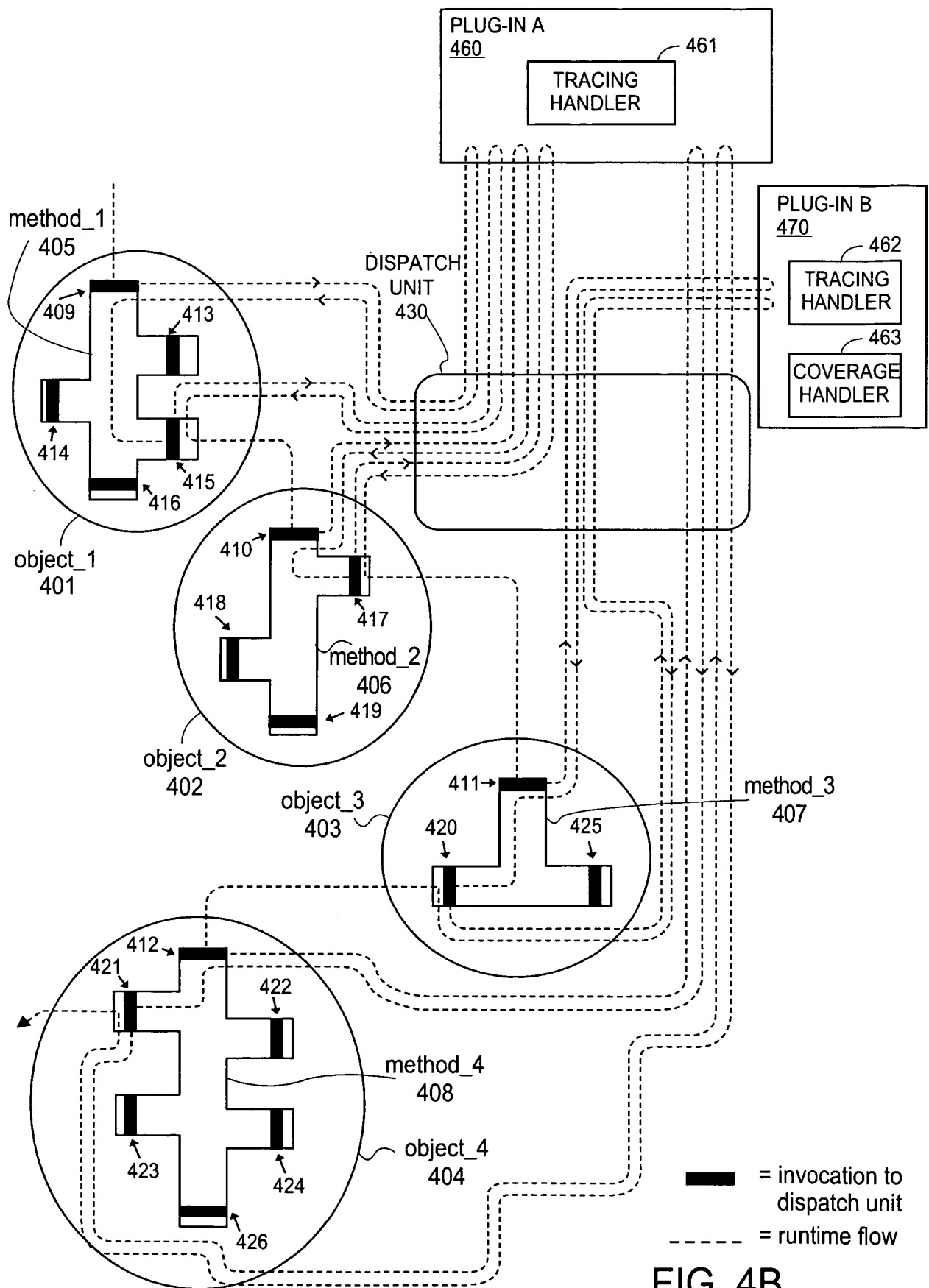


FIG. 4B

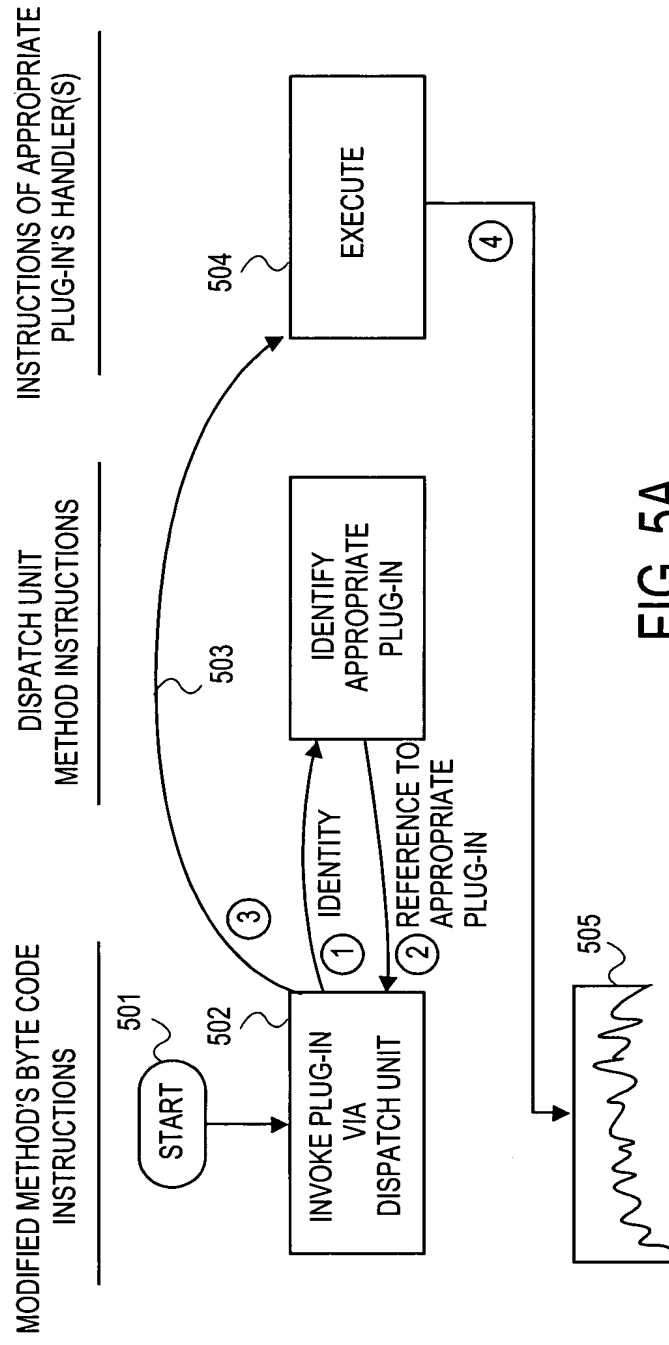


FIG. 5A

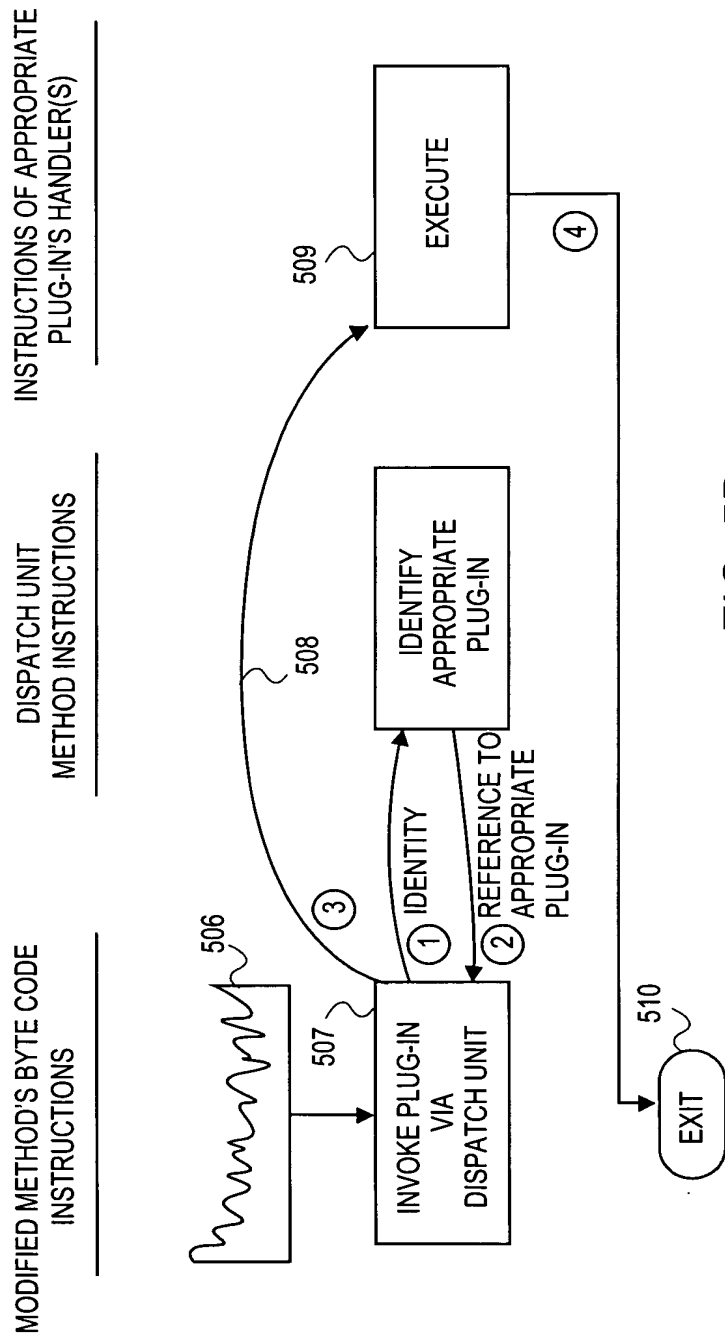


FIG. 5B

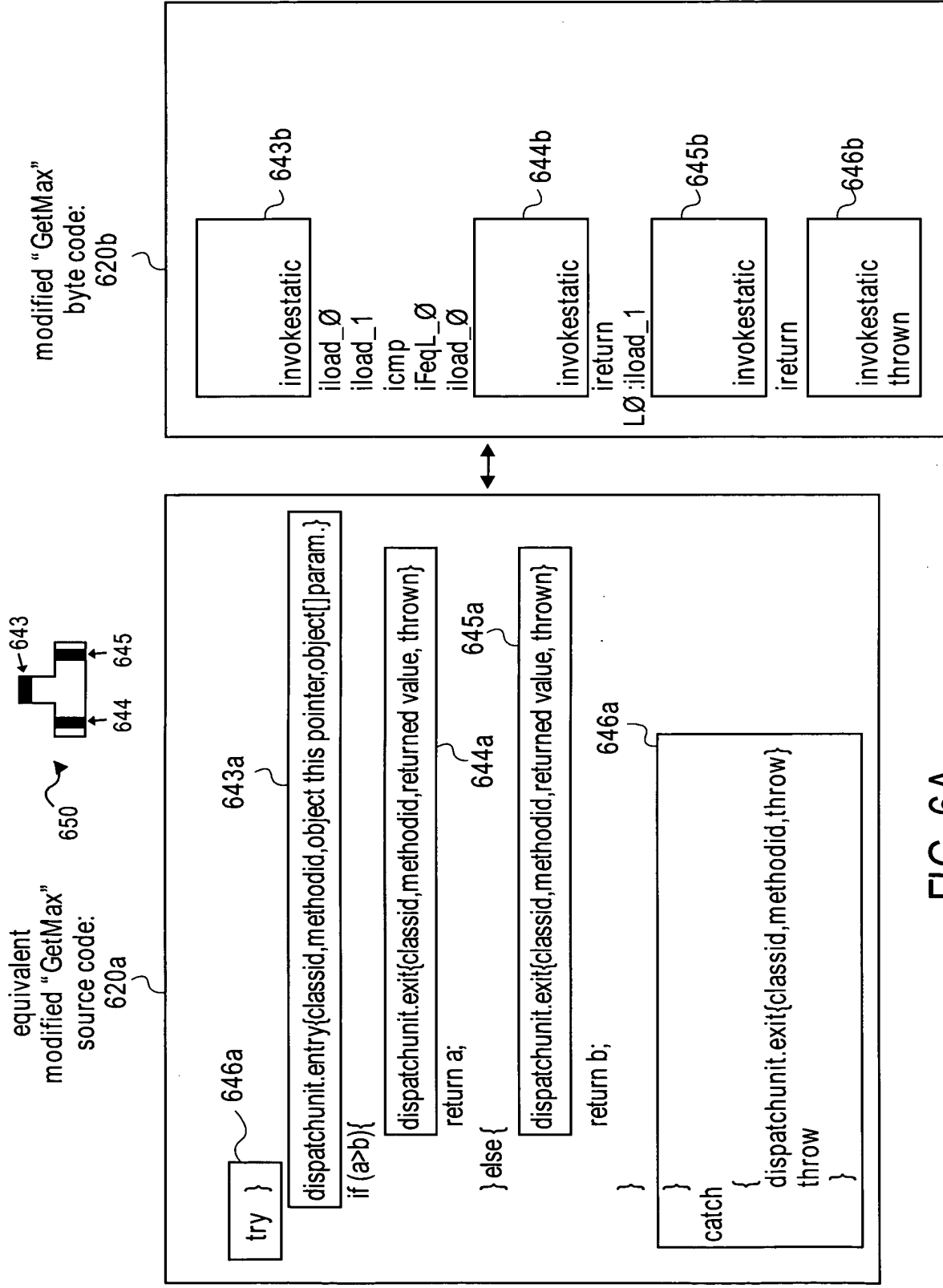


FIG. 6A

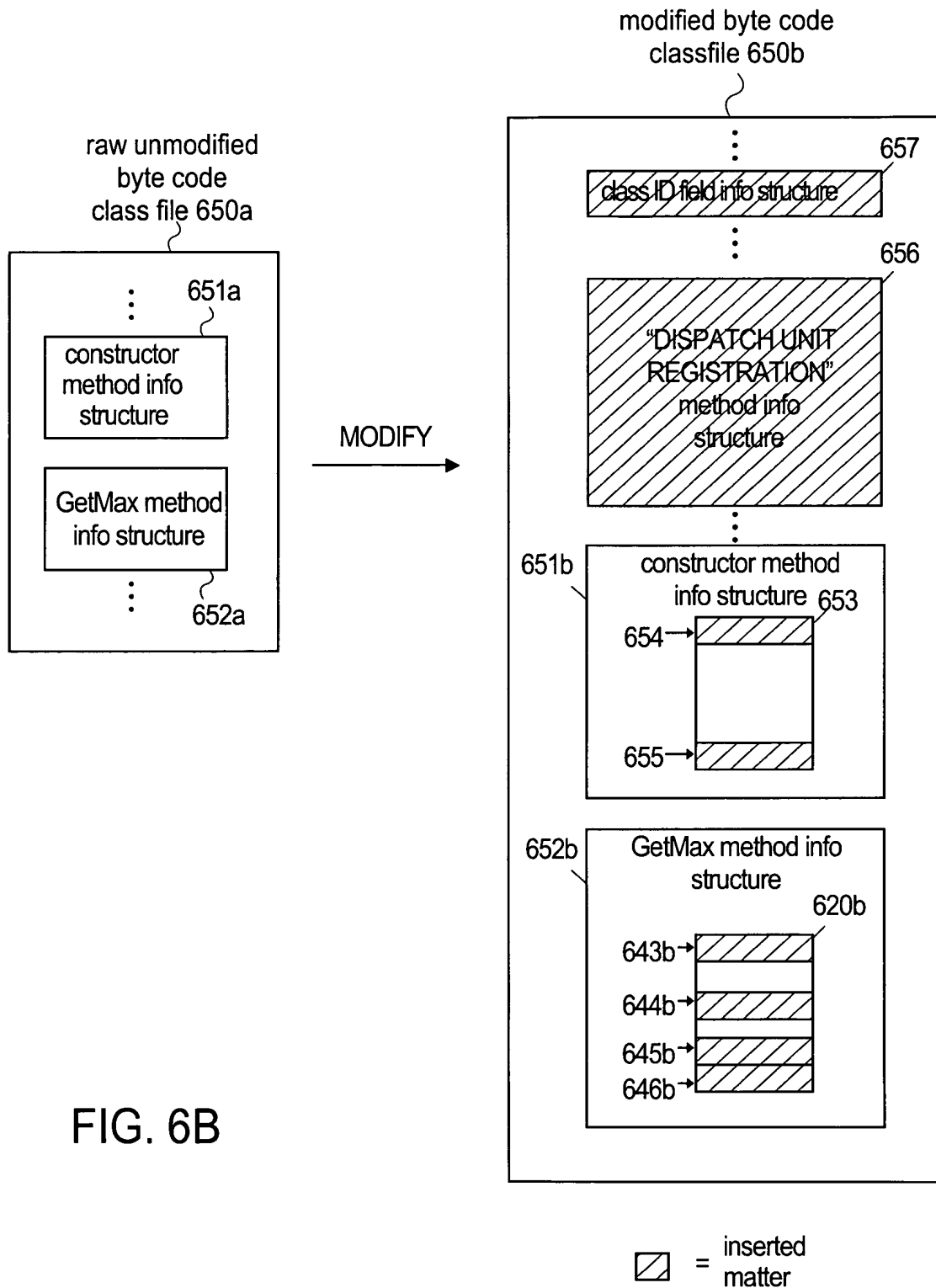


FIG. 6B

701

	INVOKING METHOD	PLUG IN MODULE
(method_1)	C <sub>1</sub> , M <sub>1</sub> , args <sub>11</sub>	PIM_A
(method_2)	C <sub>1</sub> , M <sub>2</sub> , args <sub>12</sub>	PIM_A
(method_3)	C <sub>2</sub> , M <sub>1</sub> , args <sub>21</sub>	PIM_B
(method_4)	C <sub>3</sub> , M <sub>1</sub> , args <sub>31</sub>	PIM_A

FIG. 7

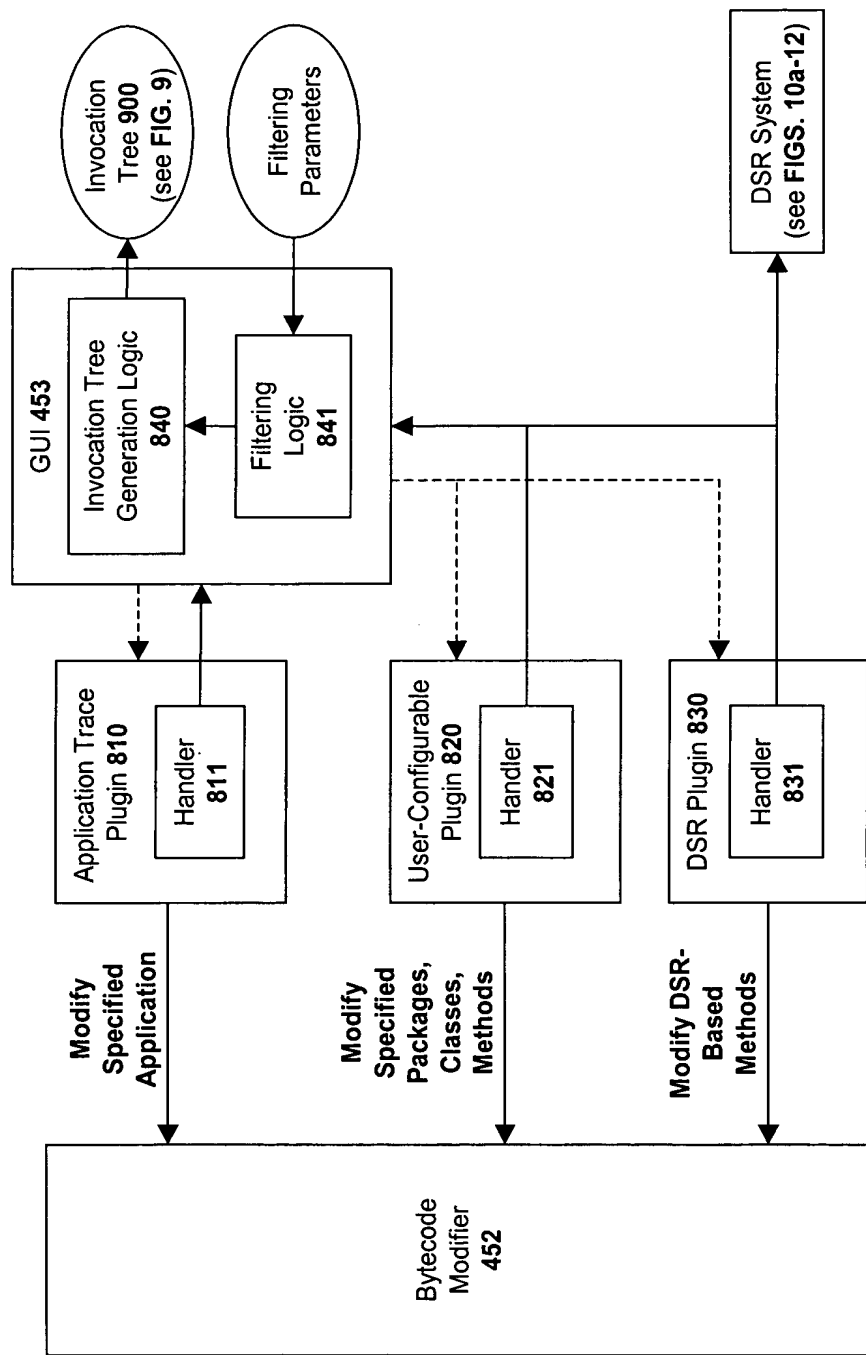


FIG. 8

# Invocation Tree

900

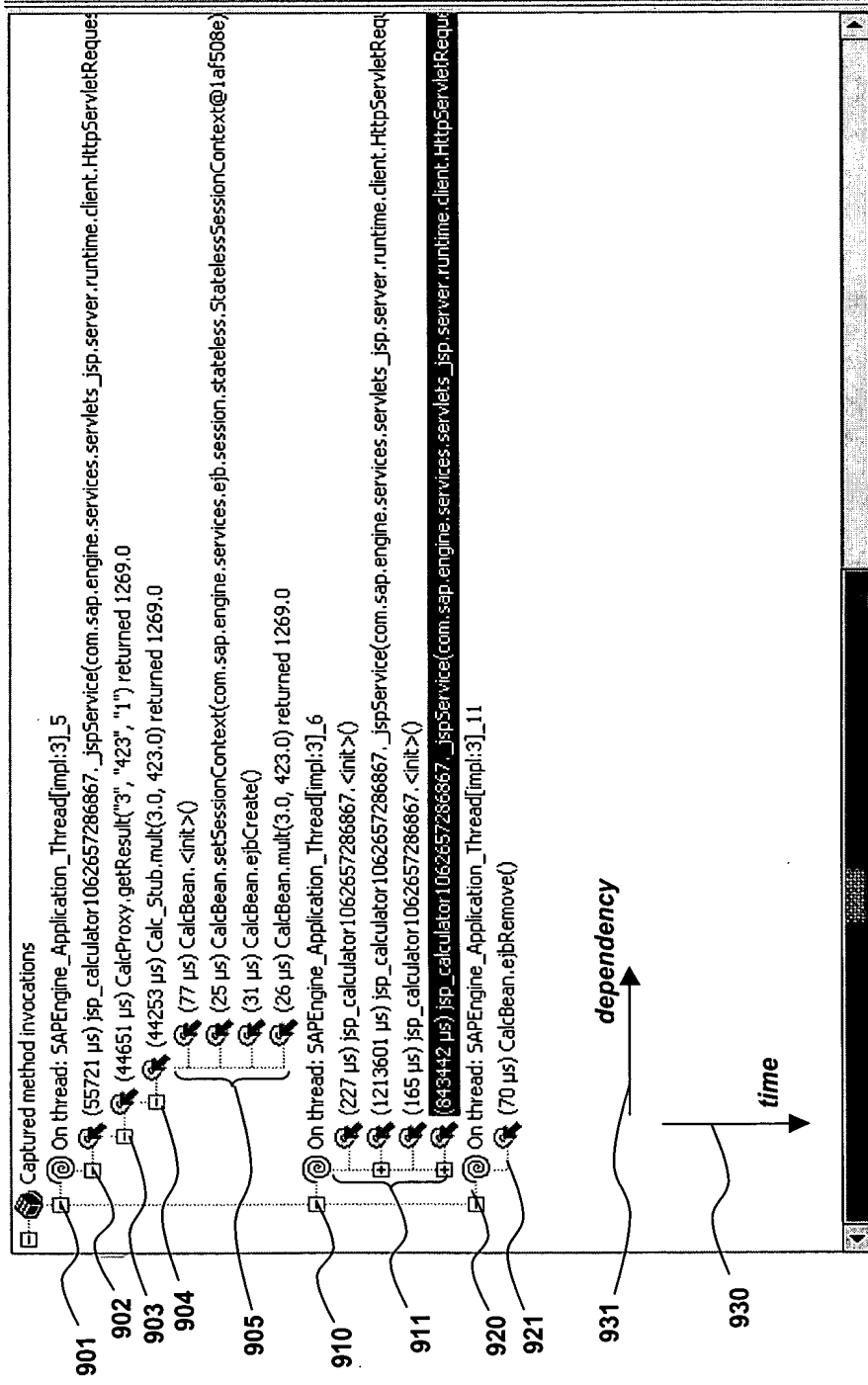


FIG. 9A



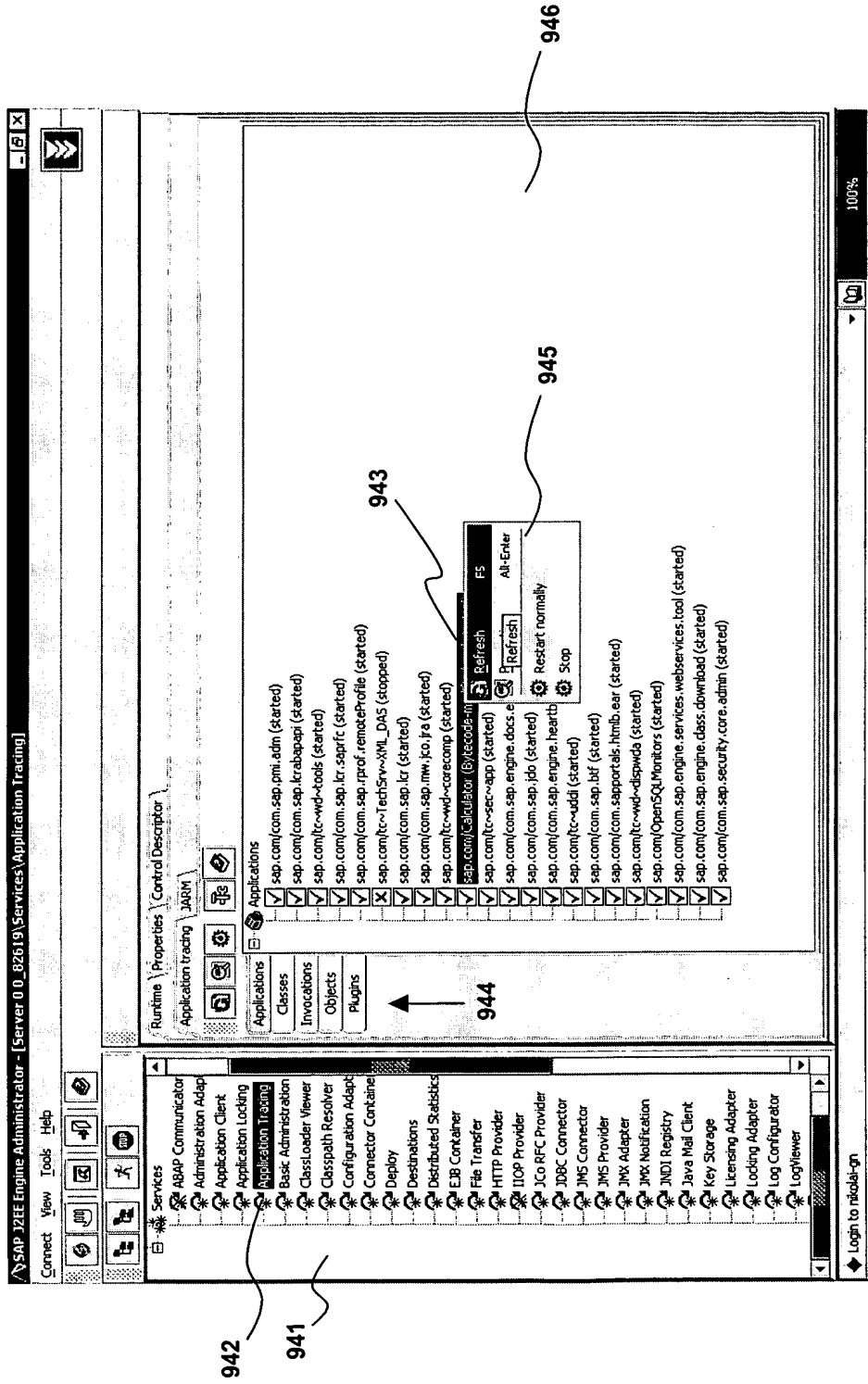


FIG. 9B

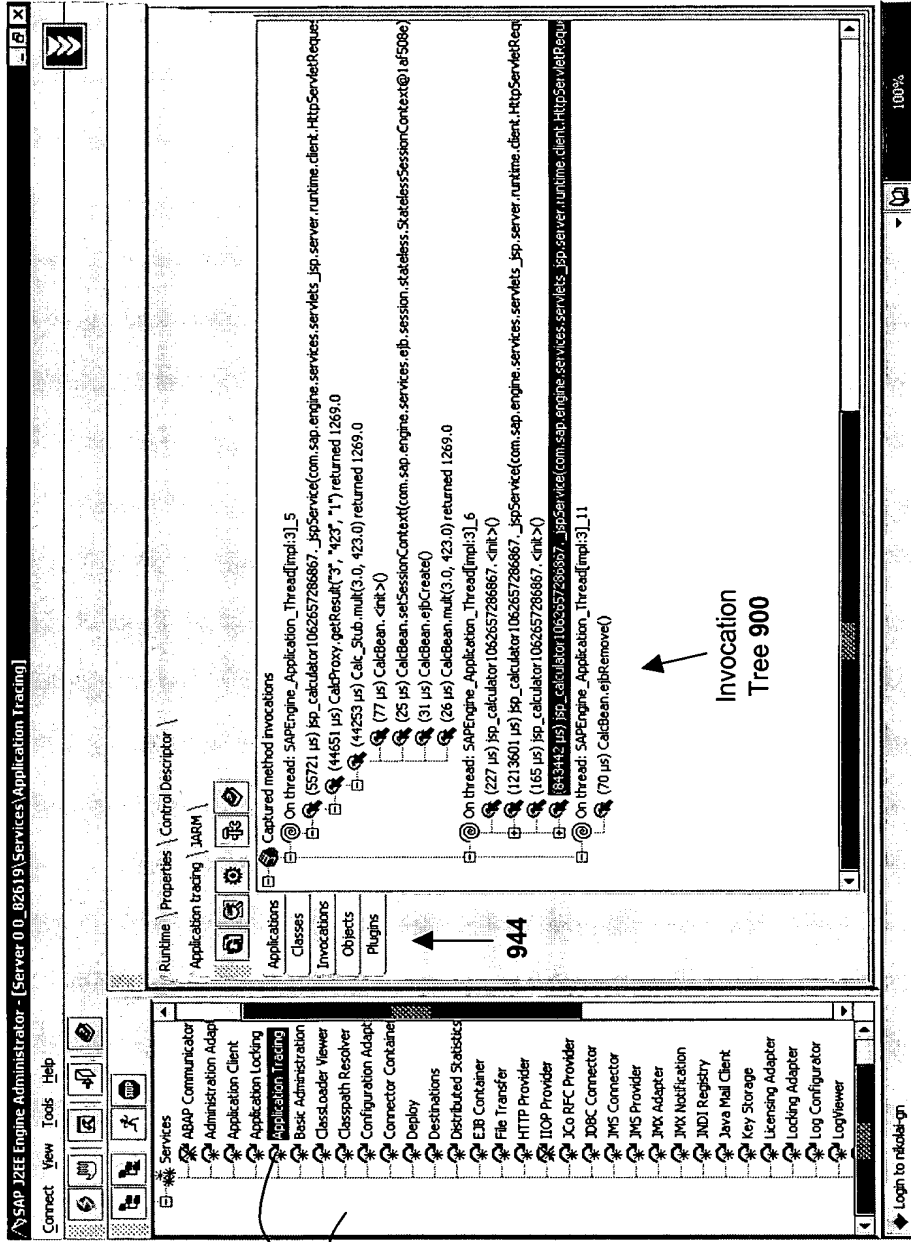


FIG. 9C

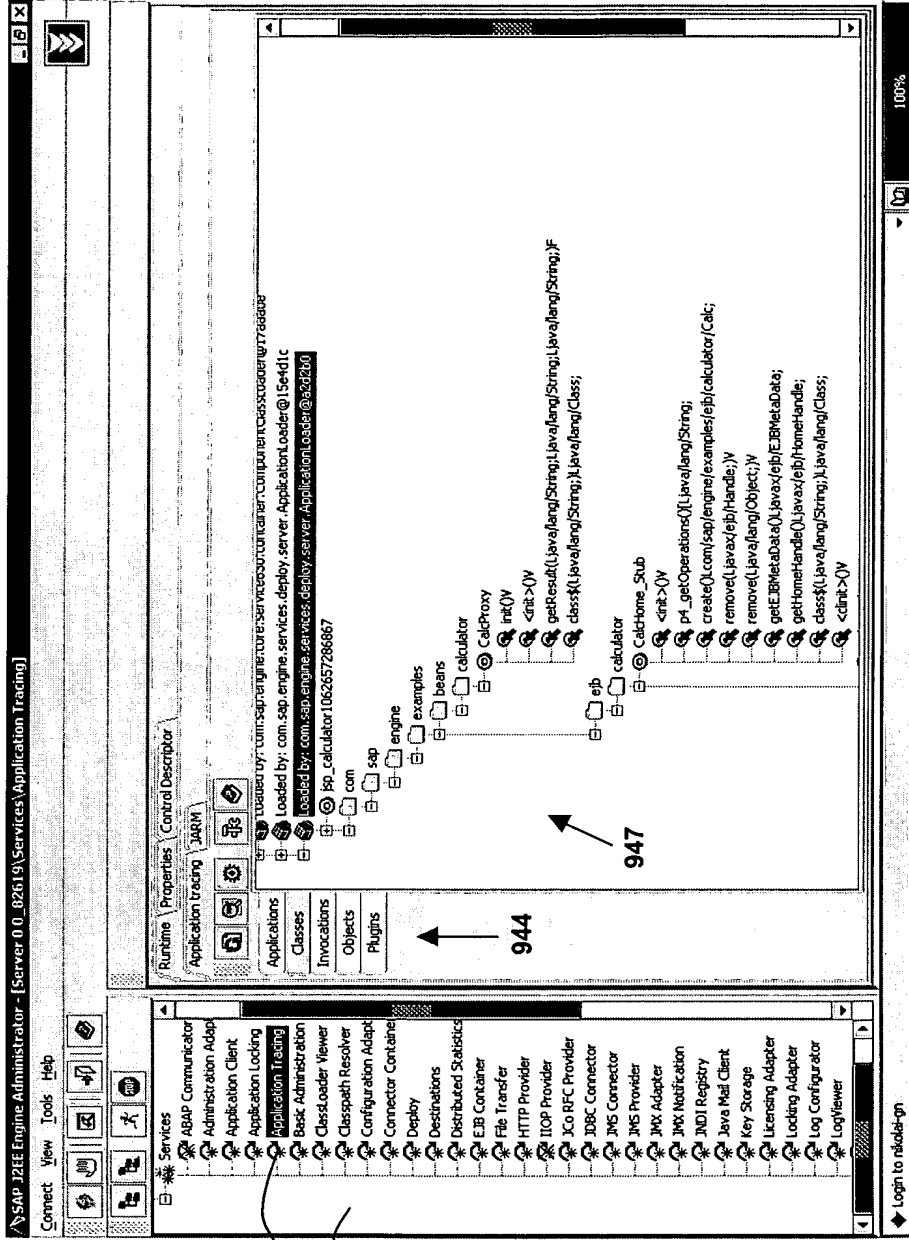


FIG. 9D



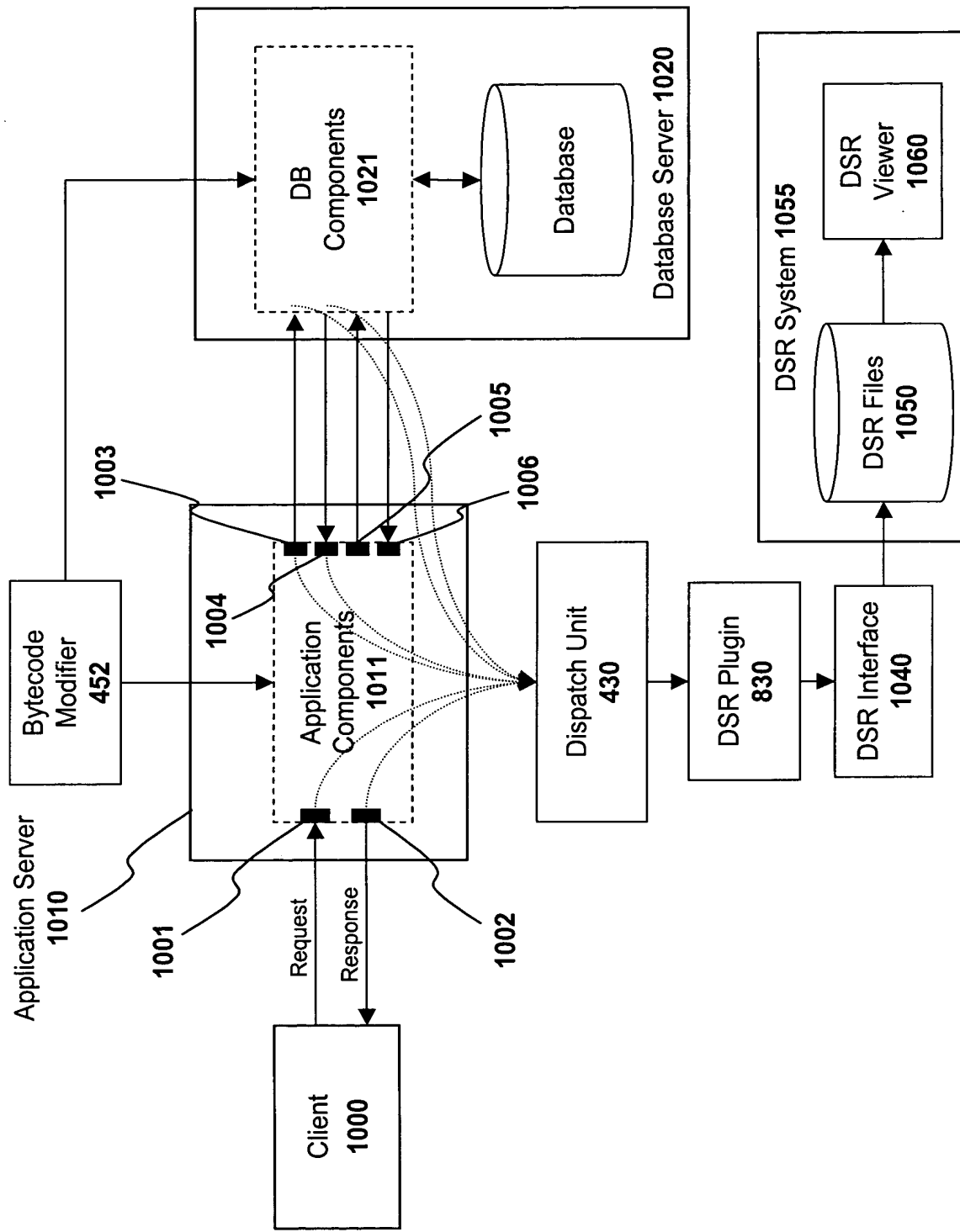


FIG. 10A

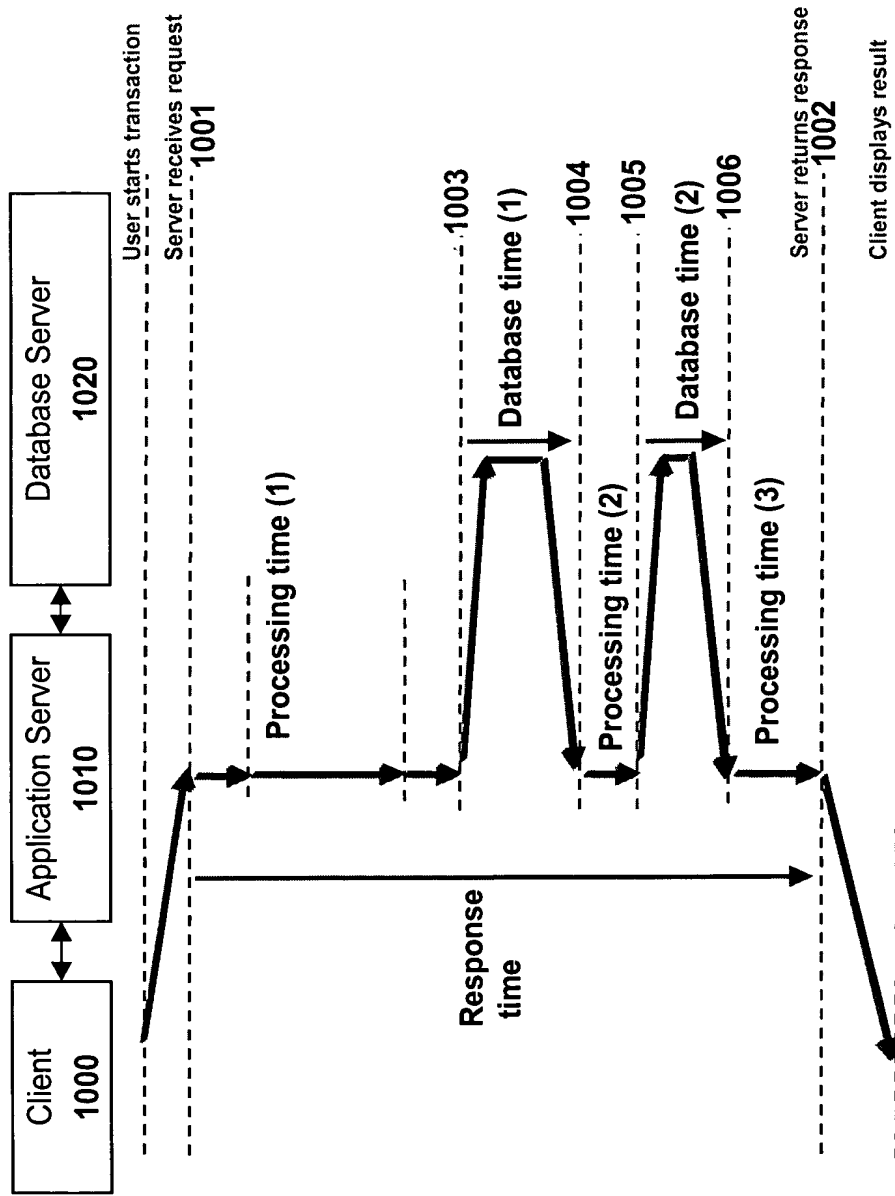


FIG. 10B

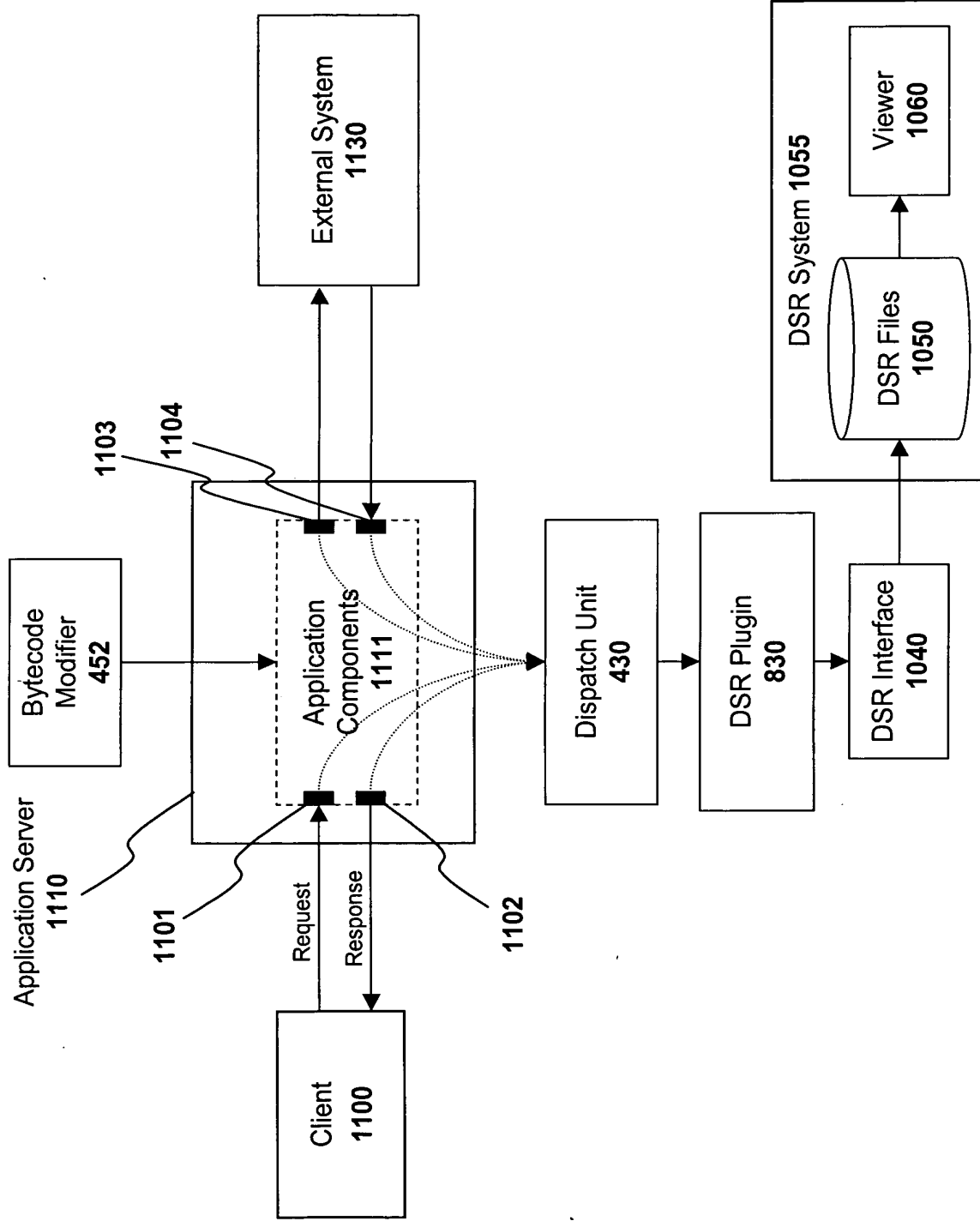
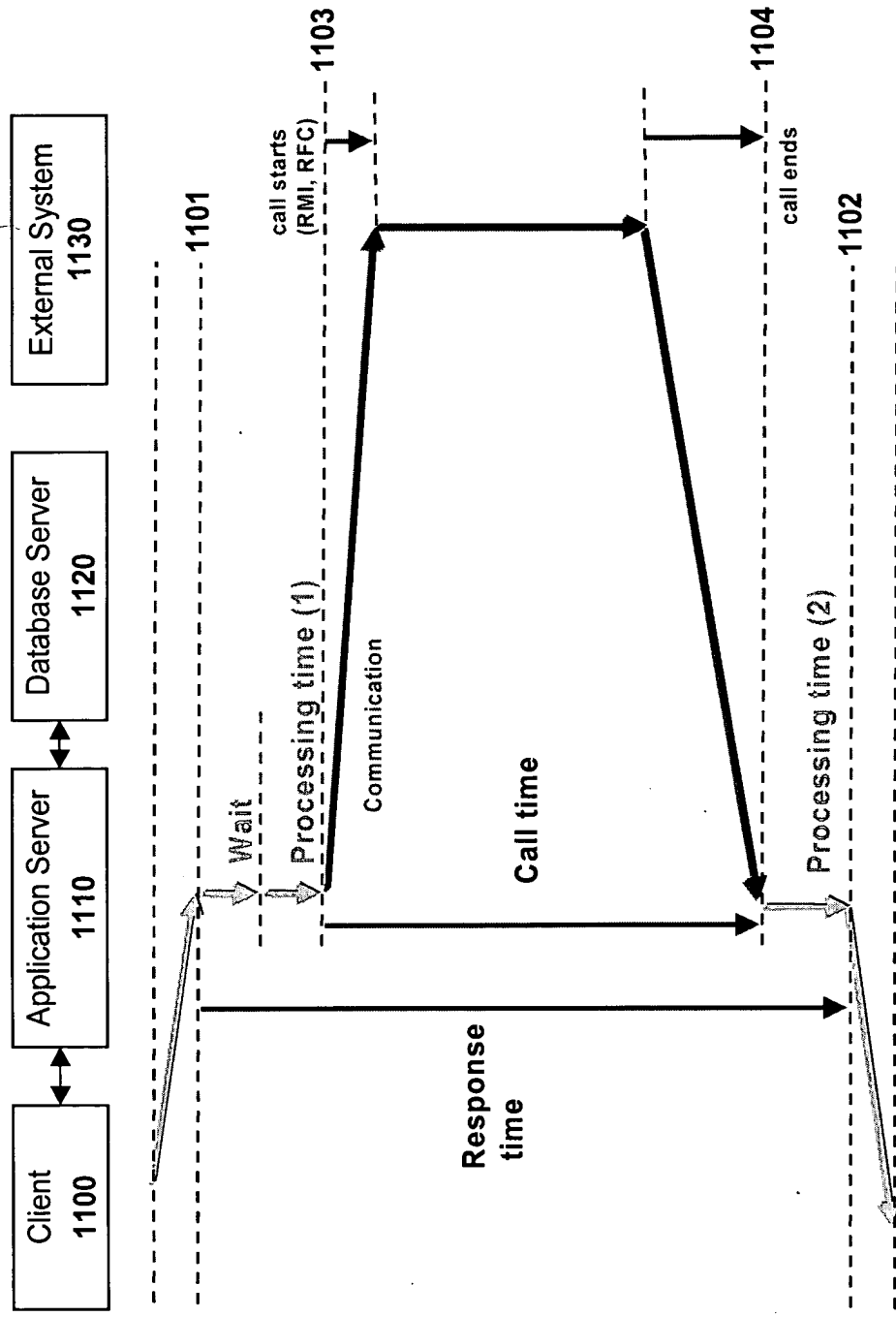


FIG. 11A





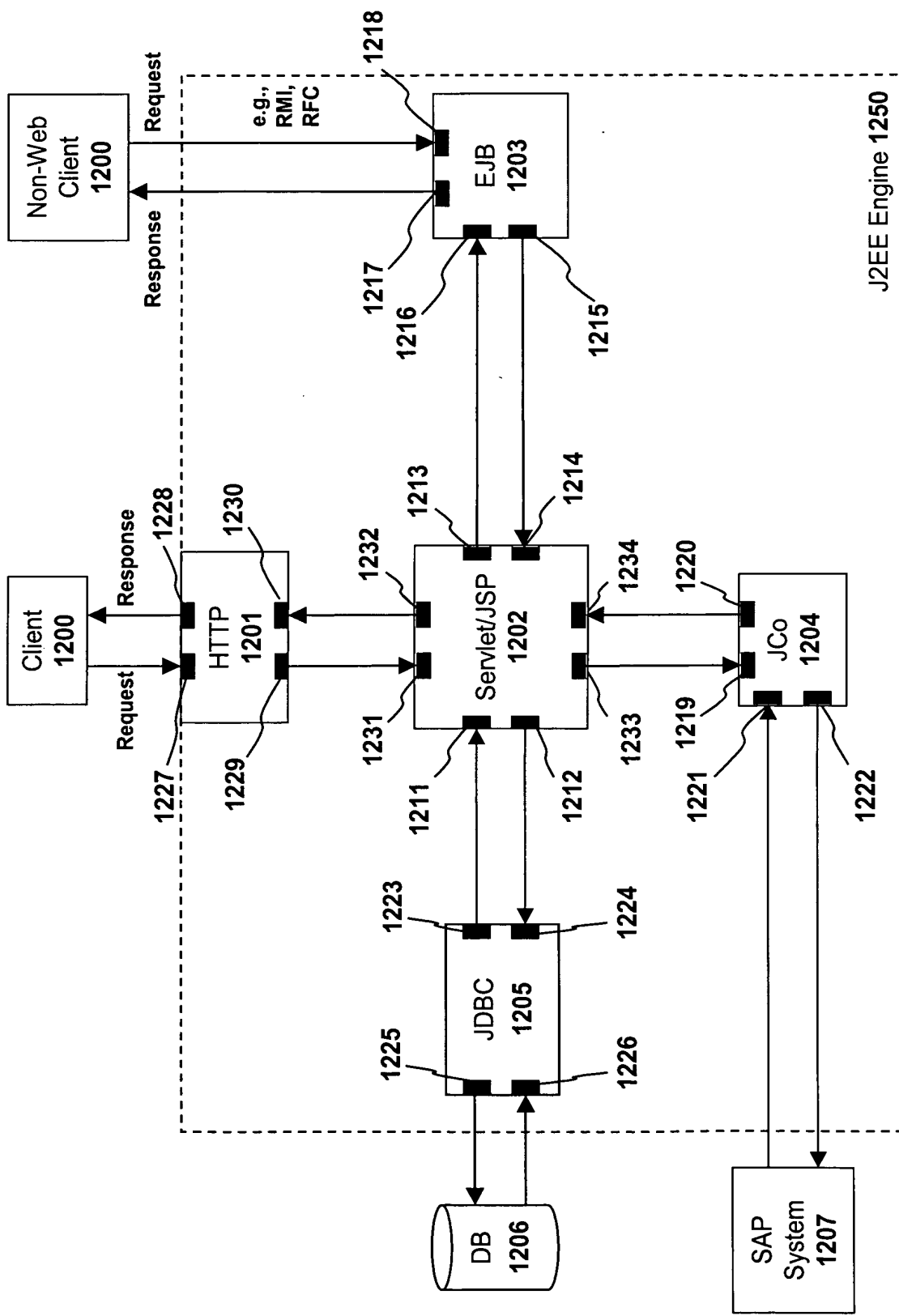


FIG. 12

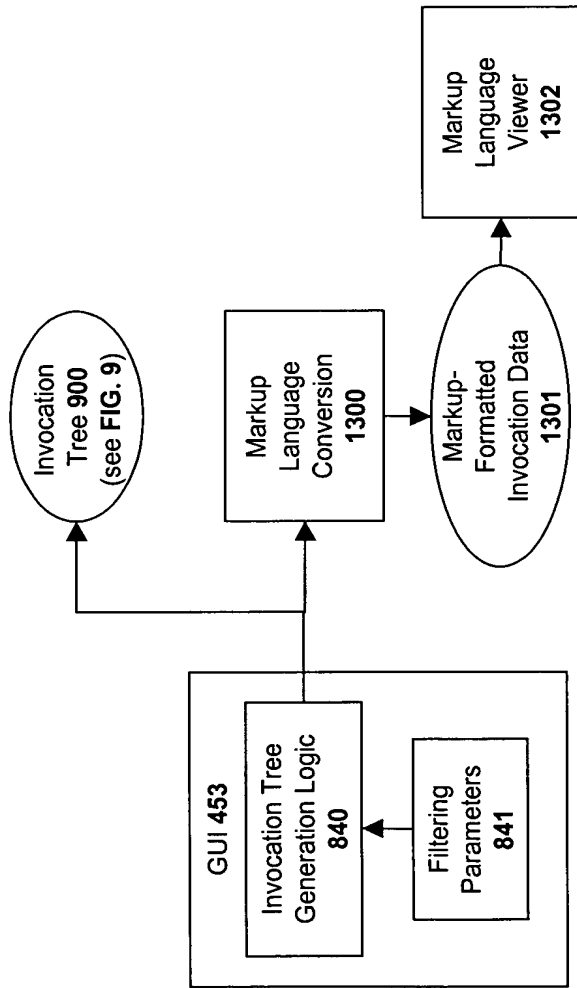


FIG. 13

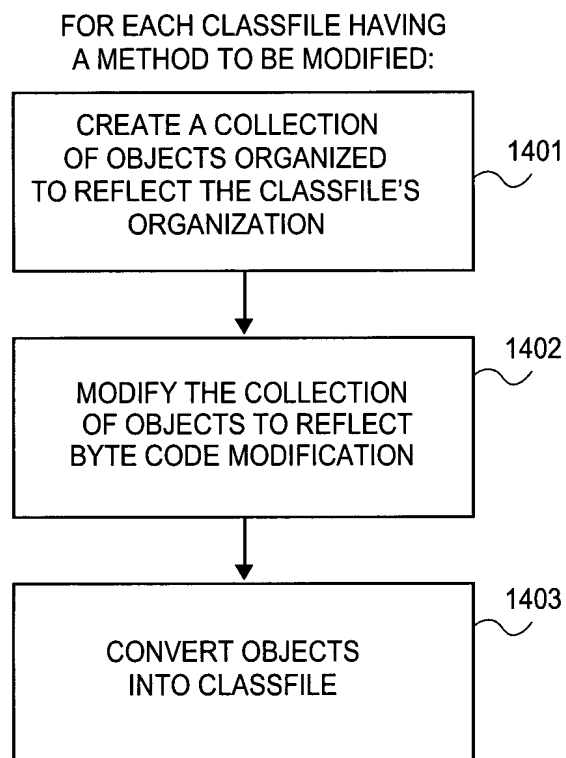


FIG. 14

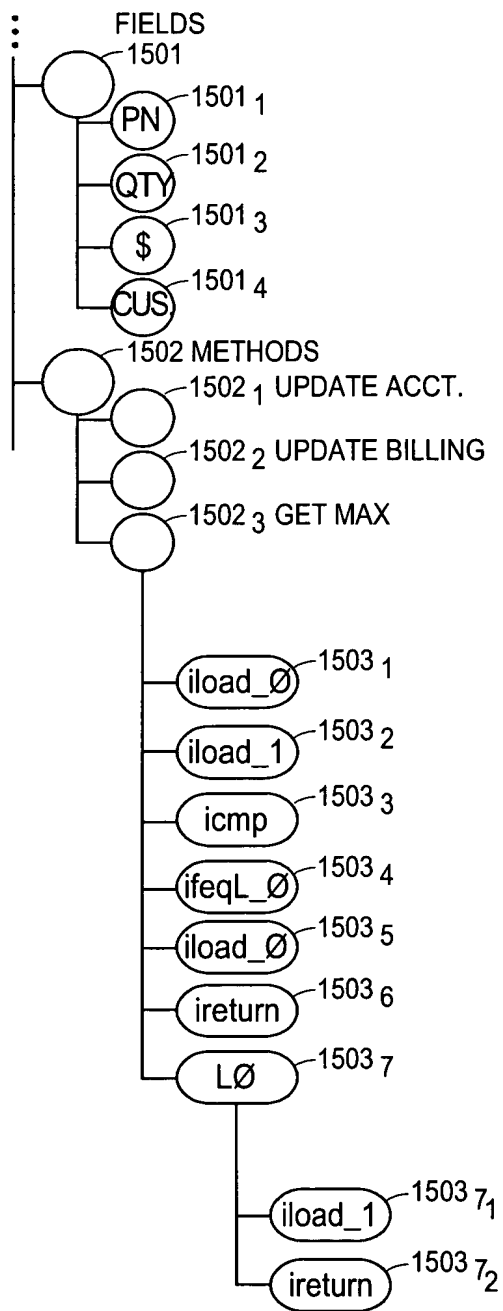


FIG. 15A

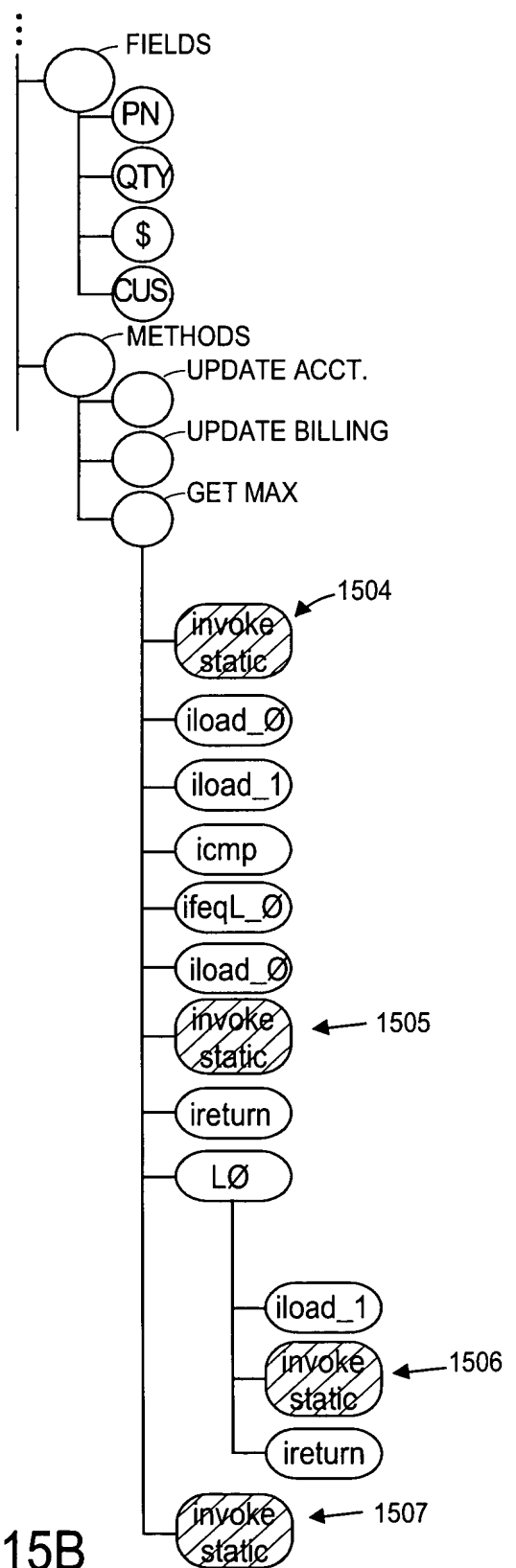


FIG. 15B

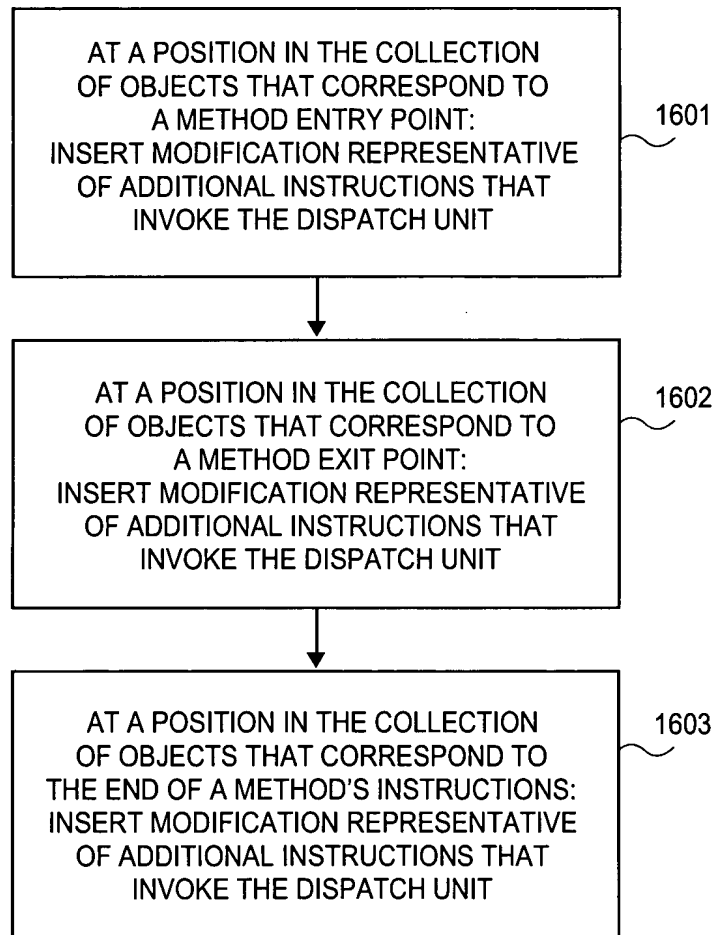


FIG. 16

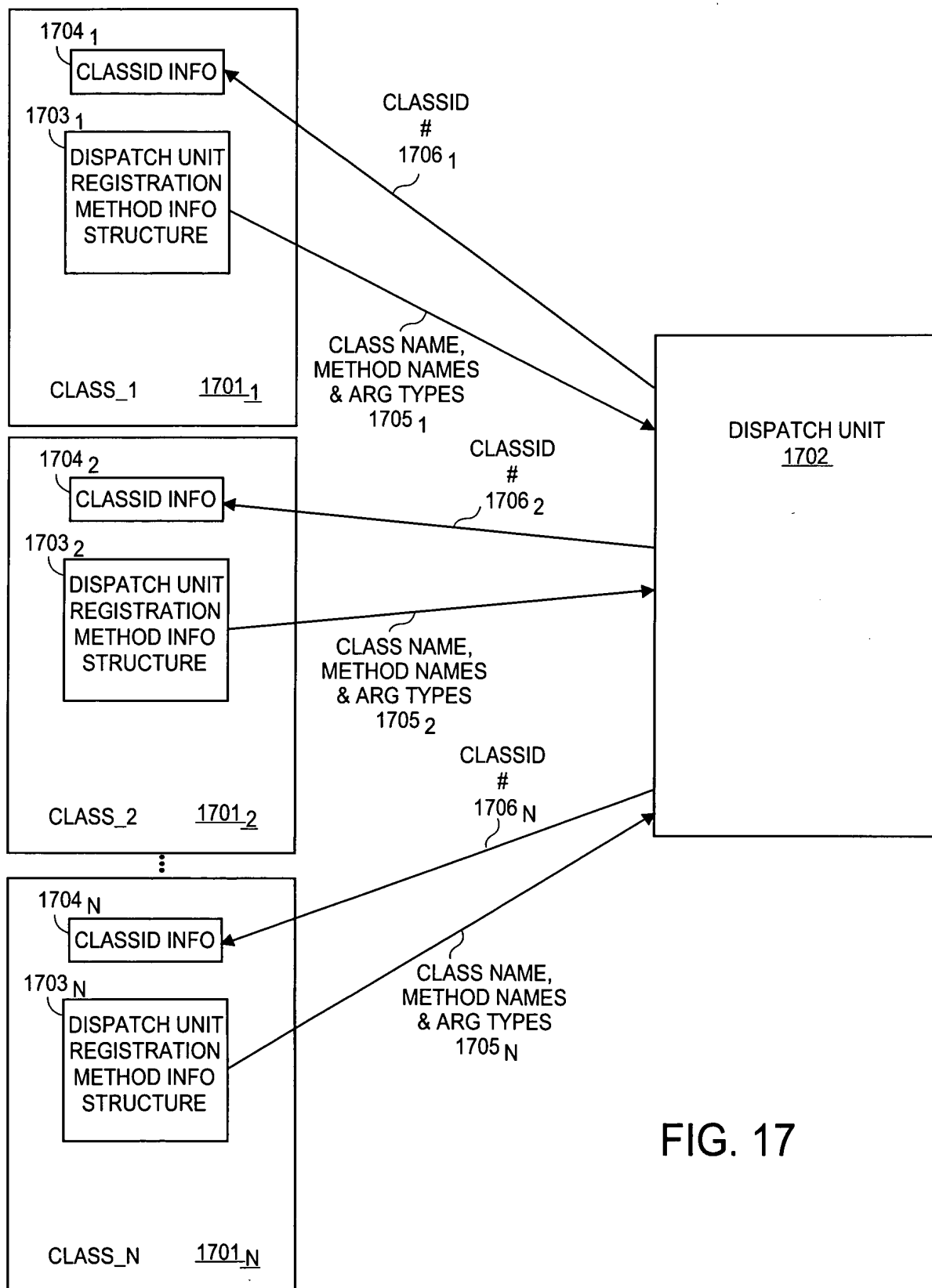


FIG. 17

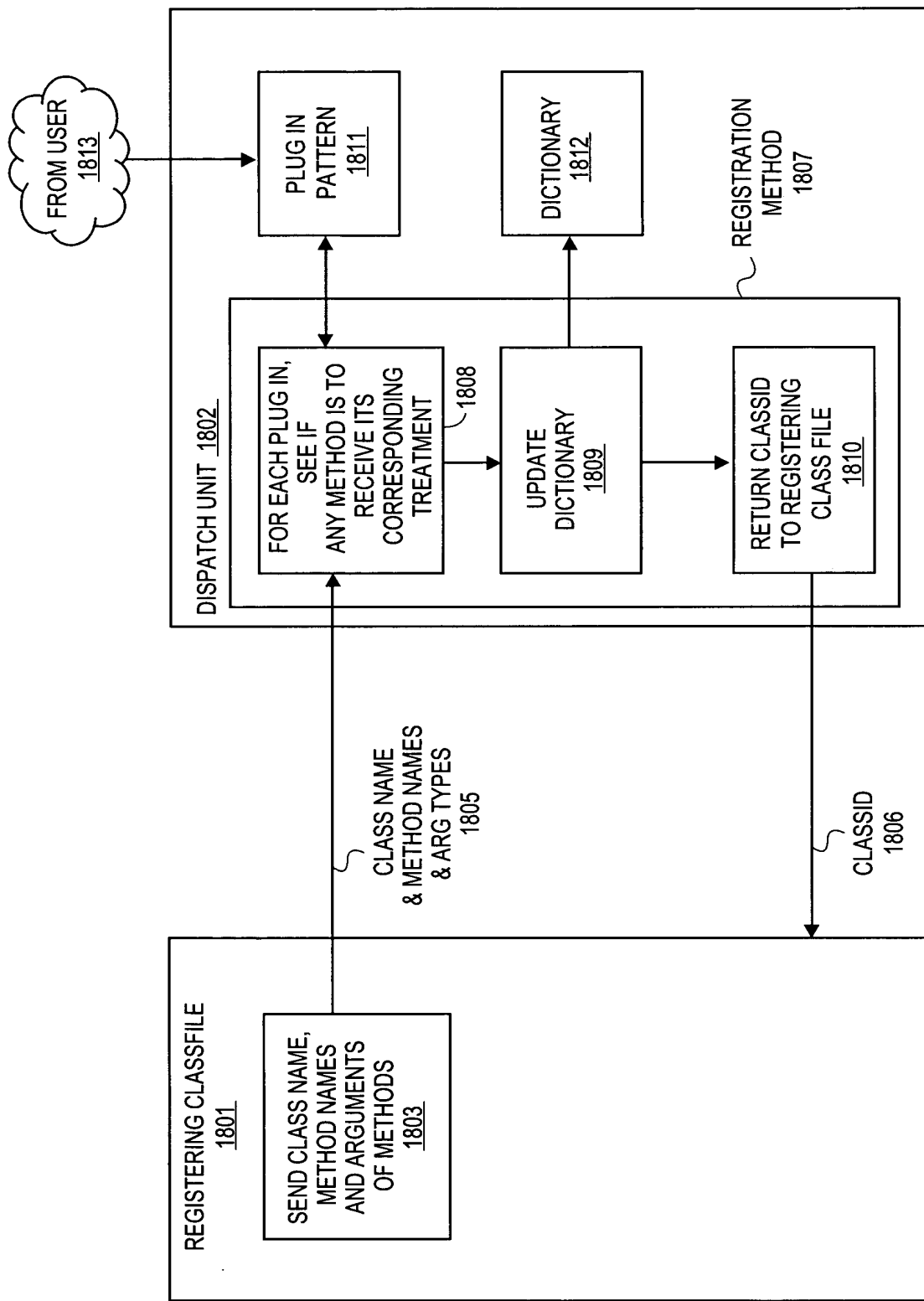


FIG. 18

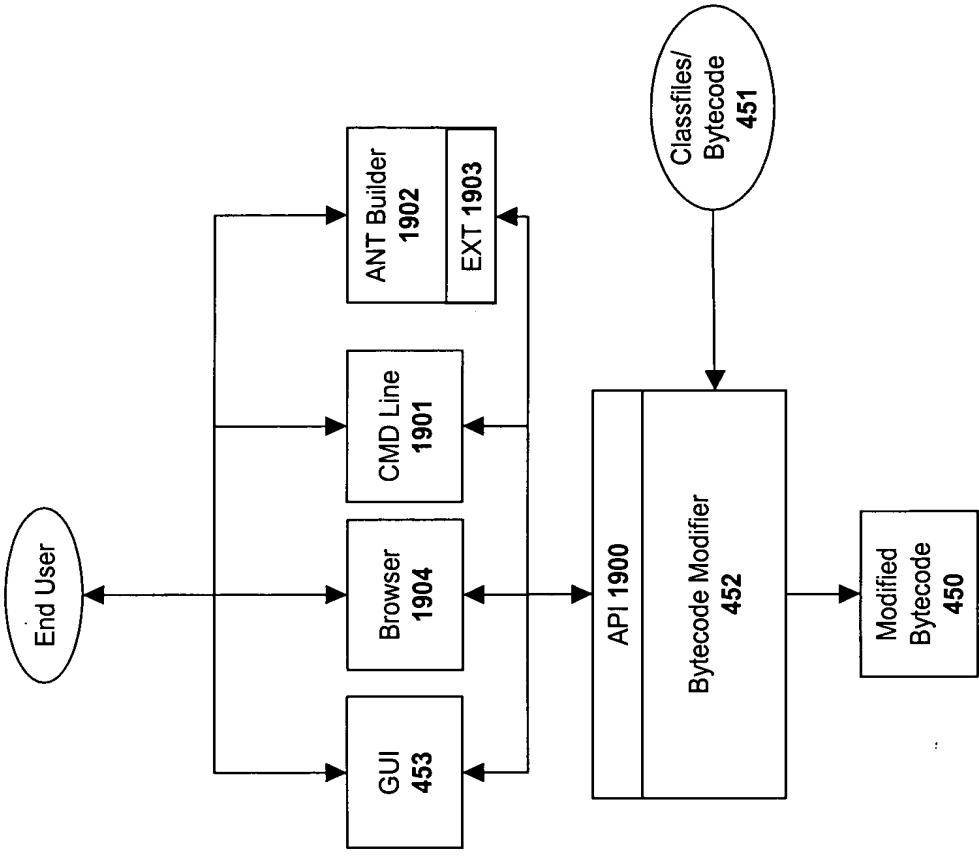


FIG. 19A



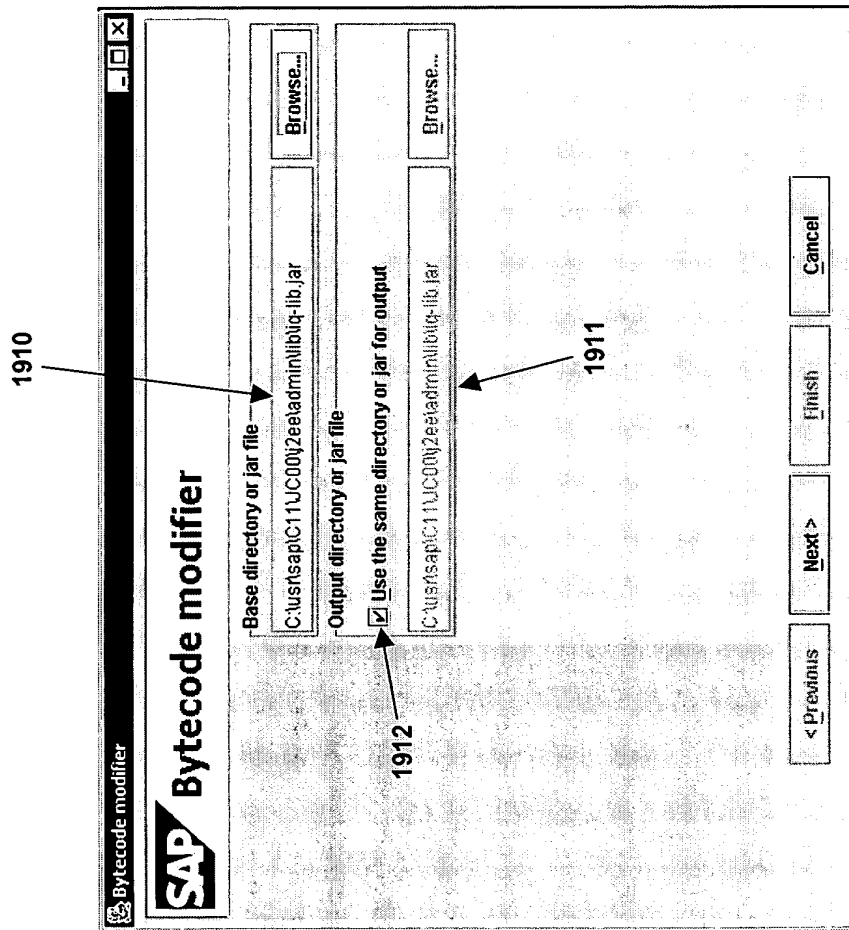
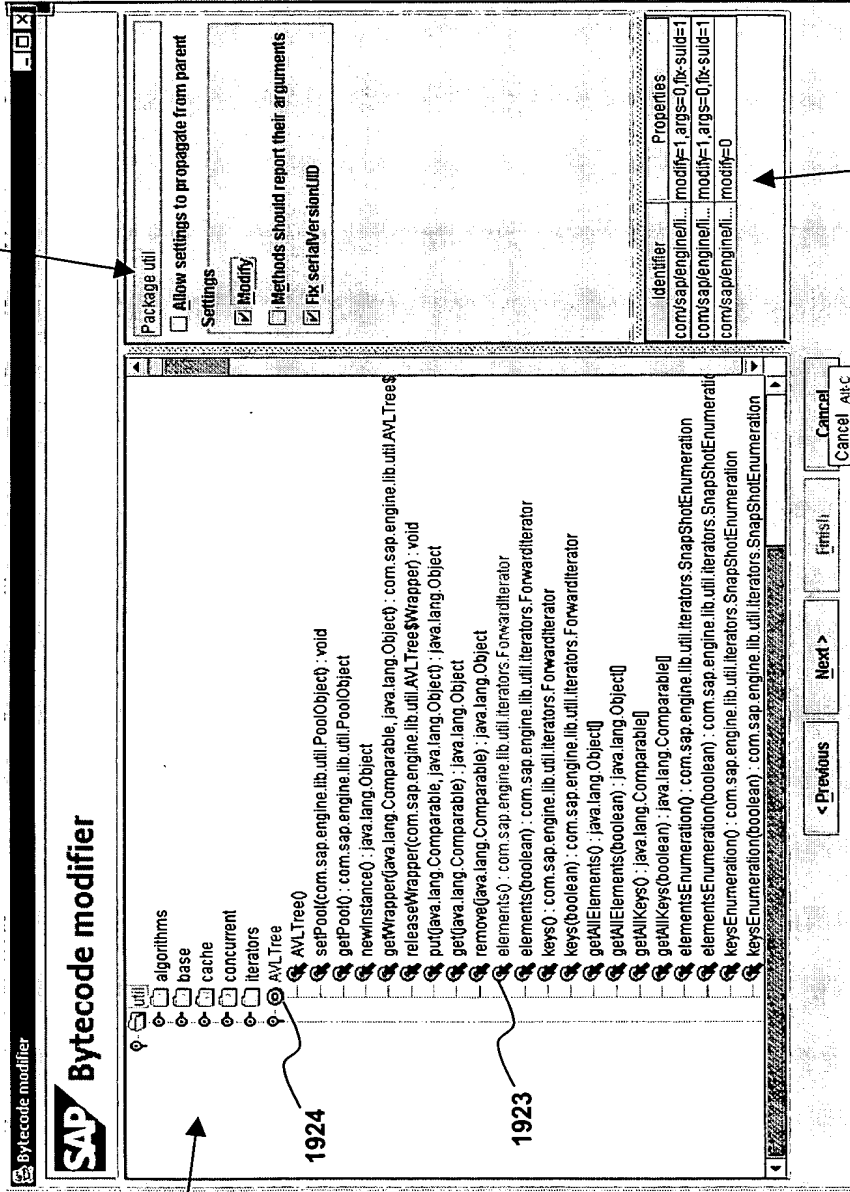


FIG. 19B

1921



1922

FIG. 19C

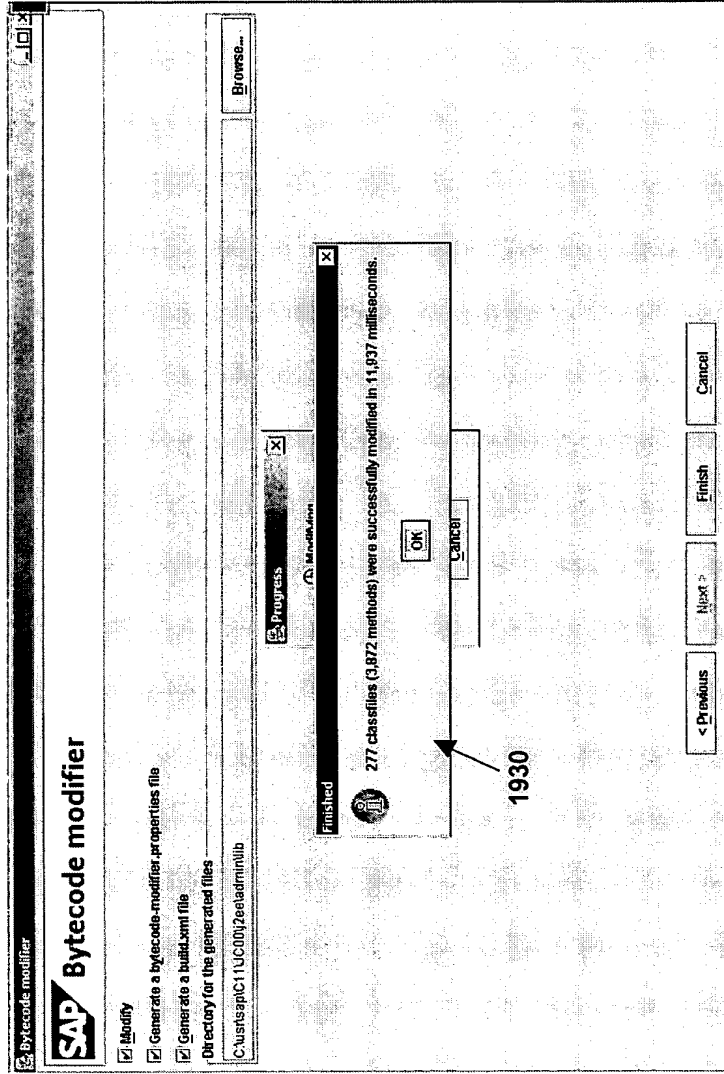
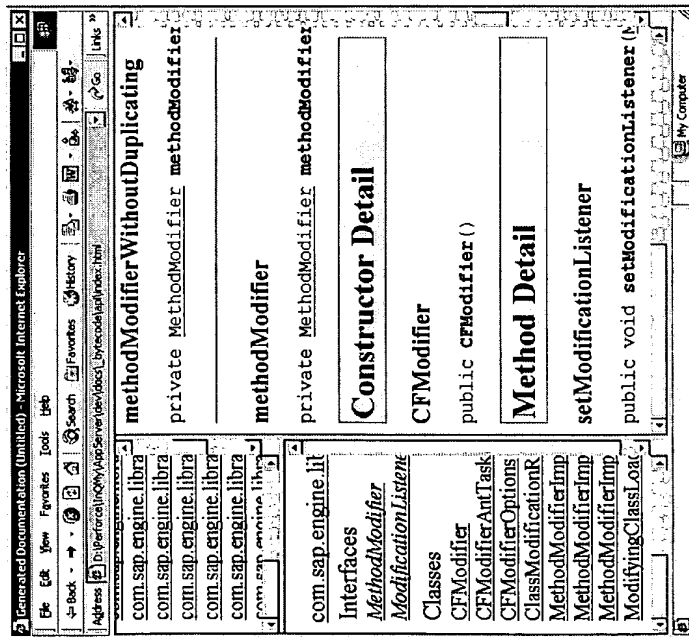


FIG. 19D



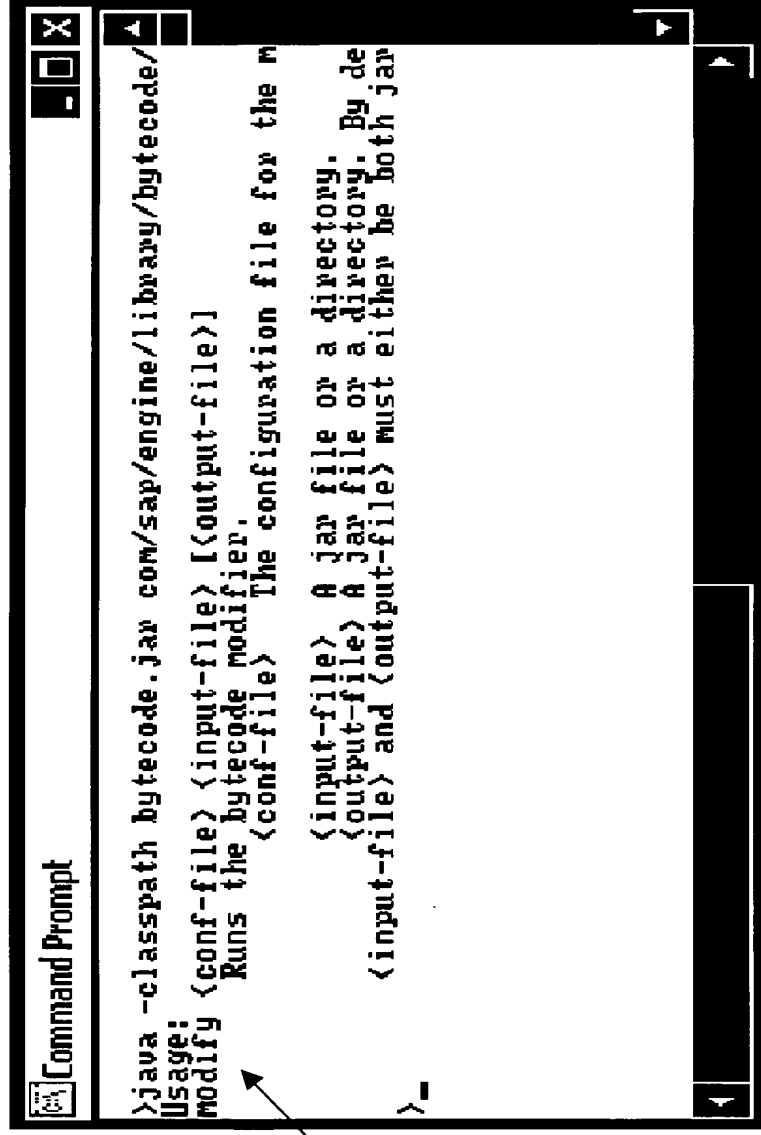
1940

FIG. 19E

```
// Direct modification of a file
CFModifier modifier = new CFModifier();
modifier.modify("D:/temp/A.class", null);

// Modification in a classloader
Class defineModifiedClass(byte[] data) {
    CFModifier modifier = new CFModifier();
    byte[] data1 = modifier.modify(data);
    return defineClass(data1);
}
```





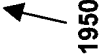
1901

FIG. 19F

ANT Builder 1902
EXT 1903



```
<taskdef name="modify"
  classname="com.sap.engine.library.bytecode.modifier.ModifierTask"
  classpath="bytecode.jar"/>
<modify conf="bytecode-modifier.properties"
  inputFile="D:\temp\classes" outputFile="D:\temp\classes1"
  check="true" verbosity="2" failonerror="true"/>
```



1950

FIG. 19G